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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/508,979

05/23/2005

Thomas Bauer

P04,0302

1163

26574 7590 01/18/2007

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EXAMINER

SUMMONS, BARBARA

ART UNIT

PAPER NUMBER

2817

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/18/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/508,979

Applicant(s)

BAUER ET AL.

Examiner

Barbara Summons

Art Unit

2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 September 2004 (pre-amend/sub-spec.).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 43-84 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 43,46-48,52,57,58,60,61,63-68 and 72-84 is/are rejected.
- 7) ☒ Claim(s) 44,45,49-51,53-56,59,62 and 69-71 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  - Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 9/24/04.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Specification***

1. The substitute specification received with the preliminary amendment of 9/24/04 has been approved for entry.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 57, 58 and 72 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 57 recites the features "the parallel track" and "the serial track" on line 2 thereof. There is insufficient antecedent basis for these features in the claims. Should claim 57 correctly depend from claim 56?

Claim 72 recites that the height of the transversal gaps is one quarter wavelength (i.e.  $\lambda$ ), but claim 71 has previously recited that the size of the transversal gaps "varies", rendering it unclear if the size/height of the transversal gaps varies or is the same quarter-wavelength size throughout the interdigital transducer. Is the dependency of claim 72 correct?

### ***Claim Objections***

4. Claims 64 and 65 are objected to because of the following informalities:

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In claim 64, on line 2, "and reflector" should be - - and a reflector - - or - - and an adjacent reflector - - since no reflector has been previously mentioned in the claim; and on line 3 "a reflector" should be changed to - - the reflector - - as recited on line 2.

Similarly, in claim 65, on line 2, "and reflector" should be changed in the same manner as in claim 64 - - and a reflector - -. See also the following suggestion to combine claims 64 and 65.

Although not being formally objected to, for increased clarity of claims 66 and 67 which refer to both "metallization ratio" and "finger period", but depend from claim 64 which mentions only "finger period", the Examiner suggests incorporating the features on claim 65 into claim 64, so that claim 64, the end of line 2 reads - - at least one of the finger period and the metallization ratio varies - -.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 43, 46-48, 52, 60, 61, 63, 73, 75, 77, 78 and 84 are rejected under 35 U.S.C. § 102(b) as being anticipated by Plesski et al. U.S. 5,682,126.

Regarding claims 43, 75, 77 and 78, Fig. 3A of Plesski et al. discloses a surface acoustic wave (SAW) filter component comprising: at least three interdigital transducers

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(IDTs) 202 and 204 on a surface of a piezoelectric substrate of  $\text{LiNbO}_3$  (see e.g. col. 6, lines 30-34) all in one acoustic track with the same finger overlapping aperture  $W$ ; first and second electrical connections  $t1/IN$  and  $t2/OUT$ ; at least one serial IDT 202 in the center is in the serial branch between  $IN$  and  $OUT$  and two parallel IDTs 204 are in parallel branches connected against a reference potential that is ground/ $t3$ ; the three IDTs are arranged in series in the propagation direction (up-down in Fig. 3A), so that the serial IDT 202 is acoustically coupled with each of the parallel IDTs 204 on either side thereof; and wherein the coupled IDTs 202 and 204 differ from each other by at least the feature b) being their different pitches period  $p1$  and  $p2$  (see also col. 6, lines 34-35) and the feature c) in that they belong to different branches being the serial and parallel branches of the component.

Regarding claims 46 and 52, Plesski discloses placing a reflector structure 210 (Fig. 5) between IDTs to control the acoustic coupling and discloses that decreasing the number of reflector electrodes, e.g. to below 100, would increase the acoustic coupling (see col. 7, lines 1-8).

Regarding claim 47, Fig. 10A shows an embodiment with two serial resonators 202 that follow each other in succession in the serial branch in the top row of the figure are electrically cascaded and arranged next to each other transverse/perpendicular to the propagation direction of the SAW which is up-down in the figure, and in which one of these IDTs 202 is acoustically coupled with a parallel branch IDT 204. Regarding claim 48, the two serial resonators that are electrically cascaded are electrically "coupled", since claim 48 does not point out that the IDTs be acoustically "coupled".

Regarding claim 60, the period  $p_2$  of the parallel IDTs 204 is greater than the period  $p_1$  ( $p_2 > p_1$ ) of the serial IDTs 202 (see col. 6, lines 34-35). Regarding claim 61, the IDTs are one-port resonators and may include further serial one-port resonators connected to the serial IDTs (see e.g. 10B vs. 10A).

Regarding claim 63, Plesski discloses the connections to include inductors 216 (Fig. 7). Regarding claim 73, the resonance frequency of the serial IDT  $f_{R,s}$  is equal to the anti resonance frequency of the parallel IDT  $f_{aR,p}$  (see col. 5, line 66 to col. 6, line 1).

Regarding claim 84, rather than connecting the terminals t3 to ground potential, Plesski discloses having them simply be a third ungrounded terminal (see Figs. 2A, 2B, 5 and 9B) that may then be considered a "free-floating internal reference potential".

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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8. Claims 64-68 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Plesski et al. U.S. 5,682,126 in view of Bauer et al. WO 00/25423 (cited by Applicants).

Plesski et al. discloses the invention as discussed above, except for the finger period or metallization ratio varying over the length of the IDT and/or a reflector.

As evidenced by Bauer et al., it would have been well known to vary the finger period or metallization ratio of an IDT and/or adjacent reflector in the transition area where they are adjacent (see Figs. 3 and 4b and the abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW resonator filter component of Plesski by having varied the finger period or metallization ratio of the IDTs in the areas where they are adjacent to other IDTs or reflectors, as suggested by the exemplary teaching thereof by Bauer et al., because such an obvious modification would have provided the advantageous benefit of reduced losses due to scattering of the SAW at the transition between two SAW structures being two IDTs or an IDT and a reflector as explicitly suggested by Bauer et al. (see the abstract, also see US 6,420,946 also cited by the Applicants as an English language translation filed as required under 37 USC § 371)[specifically see US '946 at least at col. 3, lines 1-15 and col. 3, line 65 to col. 4, line 35].

9. Claims 74 and 76 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Plesski et al. U.S. 5,682,126 in view of Amano et al. JP 10-242799.

Plesski et al. discloses the invention as discussed above, except for disclosing the serial or parallel IDTs being "detuned" to have different resonant frequencies.

Amano et al. discloses that it is known to vary the series or parallel resonators in a ladder filter such as the ladder filter of Plesski, so that they have a different finger pitch of the IDTs, which also necessarily provides that they have different resonant frequencies (see the abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW ladder filter component of Plesski by having "detuned" the serial or parallel IDTs to different resonant frequencies by changing their pitch, as suggested by the exemplary teaching thereof by Amano [see the abstract and Fig. 1 with Table 1 on page (5) where the first column gives the IDT finger pitch of the resonators], because such an obvious modification would have provided the advantageous benefit of improving desired filter characteristics such as steepness, flatness and extension of the pass band, as would have been known by one of ordinary skill and as explicitly suggested by Amano et al. (see the abstract, lines 1-3).

10. Claims 79-83 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Plesski et al. U.S. 5,682,126 taken alone.

Plesski discloses the invention as discussed above, except for disclosing a piezoelectric substrate being a piezoelectric film of the recited group on a carrier substrate, or the specific IDT, reflector, conductive structure materials, or thickness, or the device being covered by a passivation layer.



The Examiner takes Official Notice that aluminum would have been a well known conductive material in the SAW filter art and that the large range of electrode thickness (i.e. 1% to 15%) would have virtually covered the entire well known usable thicknesses in SAW filters, a piezoelectric film on a carrier substrate would have been a well known art recognized alternative piezoelectric substrate structure, and covering such devices with a passivation layer would have been extremely well known in the SAW filter art to protect the devices from environmental factors such as dust.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW filter of Plesski et al. by having provided the SAW metallization be aluminum or an aluminum alloy of the recited thickness, because Plesski is silent as to the material and thickness of the electrodes, thereby suggesting to one of ordinary skill in the art that any well known electrode material and thickness, such as aluminum or an alloy thereof with a normalized thickness of 1% to 15%, would have been usable therewith.

It would have been equally obvious to one of ordinary skill in the art at the time of the invention to have substituted a piezoelectric film of any of the recited materials on a carrier substrate for the lithium niobate piezoelectric substrate of Plesski, and to have covered the SAW filter with a passivation layer, because such obvious modifications would have respectively been the mere substitution of extremely well known art recognized alternative piezoelectric/carrier substrate structures, and a well known manner of providing the advantageous benefit of protection from environmental factors.

***Allowable Subject Matter***

11. Claims 44, 45, 49-51, 53-56, 59, 62, 69-71 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Claims 57 and 58 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Taniguchi et al. U.S. 6,172,580 discloses (see Fig. 13) making transversal gaps small in SAW resonators in ladder filters to eliminate the ripple (see the abstract), wherein the gap of "up to about  $1.0\lambda$ " is considered to include from 0 to  $1\lambda$ , such that this reference may be applicable to claim 72 upon amendment.

Komazaki et al. JP 3-201613 discloses a SAW ladder filter with acoustically coupled resonators using metallized areas G1-G3 (Fig. 1) to control the coupling (see the abstract), wherein the serial resonators 1 and 3 are acoustically coupled to each other and to parallel resonator 2.

Worley U.S. 3,970,970 also discloses acoustically coupled SAW resonators with reflectors between the resonators.


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14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

bs  
January 7, 2007

  
**BARBARA SUMMONS**  
**PRIMARY EXAMINER**